CLAIMS

1. A mask comprising:

a support frame;

a thin film formed thinner than said support frame and surrounded by said support frame;

a first section comprised of one of four sections consisting of regions obtained by dividing said thin film into four by a first straight line passing through a first point consisting of one point on said thin film and extending in a first direction and a second straight line orthogonal to said first straight line at said first point and extending in a second direction;

a second section adjacent to said first section in the first direction;

a third section adjacent to said second section in the second direction;

a fourth section adjacent to said third section in the first direction and adjacent to said first section in the second direction;

a first group of struts, in each of said first to fourth sections, comprised of a plurality of struts formed from the same material as said support frame, extending in the first direction, and formed in parallel with each other at equal intervals so as to connect with

said support frame on said thin film;

a second group of struts, in each of said first to fourth sections, comprised of a plurality of struts formed from the same material as said support frame, extending in the second direction, and formed in parallel with each other at equal intervals so as to connect with said support frame on said thin film and intersect the first group of struts;

skirts provided in parallel to said struts at said thin film at the two side parts of said struts;

strut zones comprised of said struts and said skirts at the two sides where the interval between adjacent strut zones becomes a whole multiple of at least 3 of the width of the strut zones,

a first strut zone including one of said first group of struts formed in said first section and contacting said first straight line, said first strut zone being connected to said second group of struts of said fourth section at different locations from said second group of struts of said first section in said first direction,

a second strut zone including one of said second group of struts formed in said first section and contacting said second straight line, said second strut zone being connected to said first group of struts of

said second section at different locations from said first group of struts of said first section in said second direction,

a third strut zone including one of said first group of struts formed in said third section and contacting said first straight line, said third strut zone being connected to said second group of struts of said second section at different locations from said second group of struts of said third section in said first direction;

a fourth strut zone including one of said second group of struts formed in said third section and contacting said second straight line, said fourth strut zone being connected to said first group of struts of said fourth section at different locations from said first group of struts of said third section in said second direction;

holes provided in the part of said thin film surrounded by the strut zones and passed through by a charged particle beam, said holes being formed by complementary divided patterns comprised of different parts of the same patterns in said first to fourth sections; and

four superpositioned regions of the same shapes and sizes selected from the first to fourth sections,

said superpositioned regions including the first and second straight lines,

wherein any point on the superpositioned regions is included in the thin film other than the strut zones in at least two sections of the first to four sections.

2. A mask as set forth in claim 1, wherein:

an outer circumference of said support frame is substantially circular and

said first point is the substantial center of said outer circumference.

3. A mask as set forth in claim 1, wherein said first to fourth sections are substantially square or substantially rectangular.

4. A mask as set forth in claim 1, comprising holes in at least parts of the skirts.

5. A mask as set forth in claim 1, comprising alignment marks at parts of the surfaces of the struts where the charged particle beam enters.

6. A mask as set forth in claim 1, wherein the thin film is an electroconductive layer.

7. A mask as set forth in claim 1, further comprising an electroconductive layer formed on said thin film other than the hole parts.

8. A method of producing a semiconductor device

including the step of irradiating a charged particle beam on a photosensitive surface via a mask on which predetermined patterns are formed to transfer said patterns on said photosensitive surface,

said method comprising the steps of:

using a mask comprising:

a support frame;

a thin film formed thinner than said support frame and surrounded by said support frame;

a first section comprised of one of four sections consisting of regions obtained by dividing said thin film into four by a first straight line passing through a first point consisting of one point on said thin film and extending in a first direction and a second straight line orthogonal to said first straight line at said first point and extending in a second direction;

a second section adjacent to said first section in the first direction;

a third section adjacent to said second section in the second direction;

a fourth section adjacent to said third section in the first direction and adjacent to said first section in the second direction;

a first group of struts, in each of said first to fourth sections, comprised of a plurality of struts

formed from the same material as said support frame, extending in the first direction, and formed in parallel with each other at equal intervals so as to connect with said support frame on said thin film;

a second group of struts, in each of said first to fourth sections, comprised of a plurality of struts formed from the same material as said support frame, extending in the second direction, and formed in parallel with each other at equal intervals so as to connect with said support frame on said thin film and intersect the first group of struts;

skirts provided in parallel to said struts at said thin film at the two side parts of said struts;

strut zones comprised of said struts and said skirts at the two sides where the interval between adjacent strut zones becomes a whole multiple of at least 3 of the width of the strut zones,

a first strut zone including one of said first group of struts formed in said first section and contacting said first straight line, said first strut zone being connected to said second group of struts of said fourth section at different locations from said second group of struts of said first section in said first direction,

a second strut zone including one of said

second group of struts formed in said first section and contacting said second straight line, said second strut zone being connected to said first group of struts of said second section at different locations from said first group of struts of said first section in said second direction,

a third strut zone including one of said first group of struts formed in said third section and contacting said first straight line, said third strut zone being connected to said second group of struts of said second section at different locations from said second group of struts of said third section in said first direction;

a fourth strut zone including one of said second group of struts formed in said third section and contacting said second straight line, said fourth strut zone being connected to said first group of struts of said fourth section at different locations from said first group of struts of said third section in said second direction;

holes provided in the part of said thin film surrounded by the strut zones and passed through by a charged particle beam, said holes being formed by complementary divided patterns comprised of different parts of the same patterns in said first to fourth

sections; and

four superpositioned regions of the same shapes and sizes selected from the first to fourth sections, said superpositioned regions including the first and second straight lines,

wherein any point on the superpositioned regions is included in the thin film other than the strut zones in at least two sections of the first to four sections,

to perform first exposure to transfer said complementary divided patterns of said superpositioned regions of said first to fourth sections to said photosensitive surface;

performing second exposure on said photosensitive surface to transfer overlaid said complementary divided patterns of said superpositioned region of a different section from the first exposure;

performing third exposure on said photosensitive surface to transfer overlaid said complementary divided patterns of said superpositioned region of a different section from the first and second exposures; and

performing fourth exposure on said photosensitive surface to transfer overlaid said complementary divided patterns of said superpositioned

region of a different section from the first to third exposures.

9. A mask including at least three masks,

each said mask comprising:

a support frame;

a thin film formed thinner than said support frame and surrounded by said support frame, said thin film having the same shape and size among all of the masks;

a plurality of blocks obtained by dividing said thin film into regions;

a group of selected blocks composed of selected blocks selected from said plurality of blocks, said selected blocks being connected to at least two other selected blocks or connected to at least one other selected block and said support frame;

holes formed in said thin film of non-selected blocks and passed through by a charged particle beam, in each mark, said holes formed in complementary divided patterns forming different parts of the same pattern; and

struts formed on said thin film of said group of selected blocks, said struts connected to the support frame;

all of said blocks becoming non-selected blocks in at least two of said masks.

10. A mask as set forth in claim 9, comprising said struts on a surface of said thin film at a side where said charged particle beam enters.

11. A mask as set forth in claim 9, comprising said struts on a surface of said thin film at the opposite side where the charged particle beam enters.

12. A mask as set forth in claim 9, comprising alignment marks at parts of the struts.

13. A mask as set forth in claim 9, wherein said thin film is an electroconductive layer.

14. A mask as set forth in claim 9, further comprising an electroconductive layer formed on said thin film other than said hole parts.

15. A mask as set forth in claim 9, wherein said blocks are arranged in a lattice.

16. A method of producing a mask comprising the steps of:

forming a thin film on one surface of a substrate;

forming struts on said thin film at predetermined intervals;

removing a center of said thin film from the other surface of said substrate to expose said thin film and form a support frame comprised of said substrate; and

forming holes through which a charged particle

beam passes in part of said thin film surrounded by said struts.

17. A method of producing a mask comprising the steps of:

forming a sacrifice film on one surface of a substrate;

forming struts on said sacrifice film at predetermined intervals;

removing a center part of said substrate from the other surface of said substrate to expose said sacrifice film and form a support frame comprised of said substrate;

forming a thin film on a surface of said sacrifice film at the opposite side of said struts;

forming holes through which a charged particle beam passes at parts of said thin film surrounded by said struts; and

removing the parts of said sacrifice film not contacting the support frame.

18. A method of producing a semiconductor device including the step of irradiating a charged particle beam on a photosensitive surface via a mask on which predetermined patterns are formed to transfer said patterns on said photosensitive surface,

using at least three masks on which are formed

complementary patterns forming different parts of said patterns,

each said mask comprising:

a support frame,

a thin film formed thinner than said support frame and surrounded by said support frame, said thin film having the same shape and size among all of the masks,

a plurality of blocks obtained by dividing said thin film into regions,

a group of selected blocks composed of selected blocks selected from said plurality of blocks, said selected blocks being connected to at least two other selected blocks or connected to at least one other selected block and said support frame,

holes formed in said thin film of non-selected blocks and passed through by a charged particle beam, in each mark, said holes formed in complementary divided patterns forming different parts of the same pattern, and

struts formed on said thin film of said group of selected blocks, said struts connected to the support frame,

all of said blocks becoming non-selected blocks in at least two of said masks, and comprising the steps of:

performing first exposure to transfer said complementary divided patterns of said first mask to said photosensitive surface through a first mask comprising one of said masks;

performing second exposure on said photosensitive surface through a second mask of another of said masks to transfer overlaid said complementary divided patterns of said second mask;

performing third exposure on said photosensitive surface through a third mask of another of said masks to transfer overlaid said complementary divided patterns of said third mask.